## WHAT IS CLAIMED IS:

- 1 1. A crystal of a core RNA polymerase (RNAP) that effectively diffracts X-rays
- 2 for the determination of the atomic coordinates to a resolution of better than 3.5
- 3 Angstroms.
- 1 2. The crystal of Claim 1, wherein the core RNA polymerase is a bacterial core
- 2 RNA polymerase.
- 1 3. The crystal of Claim 2, wherein the bacterial core RNA polymerase is a
- 2 thermophilic bacterial core RNA polymerase.
- 1 4. The crystal of Claim 3, wherein the thermophilic bacterial core RNA
- 2 polymerase is a *Thermus aquaticus* bacterial core RNA polymerase.
- 1 5. The crystal of Claim 1, wherein the core RNA polymerase comprises a β'
- subunit, a  $\beta$  subunit, and a pair of  $\alpha$  subunits.
- 1 6. The crystal of Claim 5, further comprising an  $\omega$  subunit.
- 1 7. The crystal of Claim 1 that effectively diffracts X-rays for the determination
- 2 of the atomic coordinates of the core RNA polymerase to a resolution of 3.3
- 3 Angstroms or better.
- 1 8. The crystal of Claim 7 having space group of P4<sub>1</sub>2<sub>1</sub>2 and a unit cell of
- 2 dimensions of a = b = 201 and c = 294 Å.
- 1 9. A method of identifying an agent for use as an inhibitor of bacterial RNA
- 2 polymerase using the crystal of Claim 1 or a dataset comprising the three-
- 3 dimensional coordinates obtained from the crystal, comprising:

- 4 (a) selecting a potential agent by performing rational drug design with
- 5 the three-dimensional coordinates determined from the crystal, wherein said
- 6 selecting is performed in conjunction with computer modeling;
- 7 (b) contacting the potential agent with the bacterial RNA polymerase;
- 8 and
- 9 (c) measuring the activity of the bacterial RNA polymerase; wherein a
- 10 potential agent is identified as an agent that inhibits bacterial RNA polymerase when
- there is a decrease in the activity of the bacterial RNA polymerase.
- 1 10. The method of Claim 9, further comprising:
- 2 (d) growing a supplemental crystal containing the core RNA polymerase
- 3 formed in the presence of the potential agent, wherein the crystal effectively
- 4 diffracts X-rays for the determination of the atomic coordinates to a resolution of
- 5 better than 5.0 Angstroms;
- 6 (e) determining the three-dimensional coordinates of the supplemental
- 7 crystal with molecular replacement analysis; and
- 8 (f) selecting a second generation agent by performing rational drug
- 9 design with the three-dimensional coordinates determined for the supplemental
- 10 crystal, wherein said selecting is performed in conjunction with computer modeling.
- 1 11. The method of Claim 10, further comprising:
- 2 (g) contacting the second generation agent with a eukaryotic RNA
- 3 polymerase; and
- 4 (h) measuring the activity of the eukaryotic RNA polymerase; wherein a

1

- 5 potential agent is identified as an agent for use as an inhibitor of bacterial RNA
- 6 polymerase when there is no change in the activity of the eukaryotic agent RNA
- 7 polymerase.

- 1 12. A method of identifying an agent that inhibits bacterial growth using the
- 2 crystal of Claim 1, or a dataset comprising the three-dimensional coordinates
- 3 obtained from the crystal, comprising:
- -4 (a) selecting a potential agent by performing rational drug design with
- 5 the three-dimensional coordinates determined for the crystal, wherein said selecting
- 6 is performed in conjunction with computer modeling;
- 7 (b) contacting the potential agent with a bacterial culture; and
- 8 (c) measuring the growth of the bacterial culture; wherein a potential
- 9 agent is identified as an agent that inhibits bacterial growth when there is a decrease
- in the growth of the bacterial culture.
- 1 13. The method of Claim 12, further comprising:
- 2 (d) growing a supplemental crystal containing the core RNA polymerase
- 3 formed in the presence of the potential agent, wherein the crystal effectively
- 4 diffracts X-rays for the determination of the atomic coordinates to a resolution of
- 5 better than 5.0 Angstroms;
- 6 (e) determining the three-dimensional coordinates of the supplemental
- 7 crystal with molecular replacement analysis; and
- 8 (f) selecting a second generation agent by performing rational drug
- 9 design with the three-dimensional coordinates determined for the supplemental
- 10 crystal, wherein said selecting is performed in conjunction with computer modeling.
- 1 14. The method of Claim 13, further comprising:
- 2 (g) contacting the second generation agent with a eukaryotic cell; and
- 3 (h) measuring the amount of proliferation of the eukaryotic cell; wherein
- 4 a potential agent is identified as an agent for inhibiting bacterial growth when there
- 5 is no change in the proliferation of the eukaryotic cell.

- 1 15. A method of identifying an agent for use as an inhibitor of bacterial RNA
- 2 polymerase using the three-dimensional coordinates for the *Thermus aquaticus* core
- 3 RNA polymerase comprising:
- 4 (a) selecting a potential agent by performing rational drug design with
- 5 the three-dimensional coordinates determined for the Thermus aquaticus core RNA
- 6 polymerase, wherein said selecting is performed in conjunction with computer
- 7 modeling;
- 8 (b) contacting the potential agent with the bacterial RNA polymerase;
- 9 and
- 10 (c) measuring the activity of the bacterial RNA polymerase; wherein a
- 11 potential agent is identified as an agent that inhibits bacterial RNA polymerase when
- 12 there is a decrease in the activity of the bacterial RNA polymerase.
- 1 16. The method of Claim 15, further comprising:
- 2 (d) growing a crystal containing a bacterial RNA polymerase formed in
- 3 the presence of the potential agent, wherein the crystal effectively diffracts X-rays
- 4 for the determination of the atomic coordinates to a resolution of better than 5.0
- 5 Angstroms;
- 6 (e) determining the three-dimensional coordinates of the crystal with
- 7 molecular replacement analysis; and
- 8 (f) selecting a second generation agent by performing rational drug
- 9 design with the three-dimensional coordinates determined for the crystal, wherein
- said selecting is performed in conjunction with computer modeling.
- 1 17. The method of Claim 16, further comprising:
- 2 (g) contacting the second generation agent with a eukaryotic RNA
- 3 polymerase; and
- 4 (h) measuring the activity of the eukaryotic RNA polymerase; wherein a
- 5 potential agent is identified as an agent for use as an inhibitor of bacterial RNA

- 6 polymerase when there is no change in the activity of the eukaryotic agent RNA
- 7 polymerase.
- 1 18. A method of identifying an agent that inhibits bacterial growth using the
- 2 three-dimensional coordinates obtained for the Thermus aquaticus core RNA
- 3 polymerase, comprising:
- 4 (a) selecting a potential agent by performing rational drug design with
- 5 the three-dimensional coordinates determined for the Thermus aquaticus core RNA
- 6 polymerase, wherein said selecting is performed in conjunction with computer
- 7 modeling;
- 8 (b) contacting the potential agent with a bacterial culture; and
- 9 (c) measuring the growth of the bacterial culture; wherein a potential
- agent is identified as an agent that inhibits bacterial growth when there is a decrease
- in the growth of the bacterial culture.
- 1 19. The method of Claim 18 further comprising:
- 2 (d) growing a crystal containing a bacterial RNA polymerase formed in
- 3 the presence of the potential agent, wherein the crystal effectively diffracts X-rays
- 4 for the determination of the atomic coordinates to a resolution of better than 5.0
- 5 Angstroms;
- 6 (e) determining the three-dimensional coordinates of the crystal with
- 7 molecular replacement analysis; and
- 8 (f) selecting a second generation agent by performing rational drug
- 9 design with the three-dimensional coordinates determined for the crystal, wherein
- said selecting is performed in conjunction with computer modeling.
- 1 20. The method of Claim 19, further comprising:
- 2 (g) contacting the second generation agent with a eukaryotic cell; and

- 3 (h) measuring the amount of proliferation of the eukaryotic cell; wherein
- 4 a potential agent is identified as an agent for inhibiting bacterial growth when there
- 5 is no change in the proliferation of the eukaryotic cell.
- 1 21. A method of obtaining a crystal of a core bacterial RNA polymerase
- 2 comprising growing a core bacterial RNA polymerase crystal in a buffered solution
- 3 containing 40-45% saturated ammonium sulfate.
- 1 22. The method of Claim 21 wherein said growing is performed by a method
- 2 selected from the group consisting of batch crystallization, vapor diffusion, and
- 3 microdialysis.